Mechanical specifications for replacement rooftop units for the Sevier County Jail, 4 through 15 ton gas/electric rooftops

Technical Summary

- The jail has a Trane Tracer Summit control system currently in place.
- The existing rooftop units serving the jail are manufactured by Trane.
- The costs to interface the new units to the existing Summit control system, and communication link, are included in the cost of the new rooftop units.
- To avoid repair costs for the county, 5-year parts and labor warranties are included.
- To further contain parts costs, compressors and gas heat exchangers carry 10-year parts warranties.

General Specifications- (detailed specifications follow)

Tag Data – Trane 4 through 15 Ton R410A PKGD Unitary Gas/Electric Rooftop (Qty: 14)

Item	Tag(s)	Qty.	Description	Model Number/ EER/ IEER	Equipment price	Labor	Total price
A1	RTU-10, 13 and 14	3	4 Ton Gas/Electric Rooftop	YHC048 / 15.0 / 15.0			
A2	RTU-7,8 and 9	3	5 Ton Gas/Electric Rooftop	YHC060 / 15.0 / 15.0			
A3	RTU-1 thru 6	6	7.5 Ton Gas/Electric Rooftop	YHC092 / 12.6 / 14.5			
A4	RTU-12	1	10 Ton Gas/Electric Rooftop	YHC120 / 12.5 / 14.0			
A5	RTU-11	1	15 Ton Gas/Electric Rooftop	YHD180 / 12.0 / 13.3			

Bidders should put the equipment price, labor and total price in the table above and return this sheet with their bid.

- DX cooling with natural gas heat
- Dual scroll compressors with unequal sizes- 7.5 tons and above
- **Three-stages of cooling capacity (7.5 through 15 ton)**
- **High efficiency-** The 4 and 5 ton EER values are actually SEER
- 208/ 230 volt 3 phase
- **The Supply fan on 7.5, and 10 ton units is a direct drive plenum fan, with backward curved wheel, and variable speed motor. A variable speed potentiometer is located in the control box. No fan belts are required for these units**
- Microprocessor ReliaTel controller with all unit safeties and control algorithms pre-programmed

Lontalk(R) (Comm 5) communications interface to allow these units to communicate with the existing Trane Summit control system

- Dual compressors (7.5 ton and up)
- **High HP supply fan motor**
- Standard 2" thick air filters
- Economizer Fresh Air Damper (7.5 ton and up)
- Barometric Relief damper to help prevent over-pressurizing the spaces during economizer operation
- Motorized OA damper -4 and 5 ton units
- Thermostats with remote sensors as required for secure areas

Adapter curbs are provided to transition from the existing roof curb to the new units (Fld)

Phase monitoring- All units have phase monitoring protection including:
Phase loss protection
Phase monitoring protection
Phase unbalance protection

Discharge line thermostat: For enhanced compressor protection, a discharge line thermostat is standard on the compressor discharge line. It provides extra protection to the compressors against high discharge temps in case of loss of charge, extremely high ambient and other conditions.

Factory Testing: All units shall be 100 percent run tested before leaving the factory. Should any unit fail to pass any of the following tests, it is not allowed to ship. These tests confirm:

- Cooling operation
- Fan and blower rotation
- Control sequence
- Motor & wiring dielectric test
- Unit voltage
- Indoor fan rotation & rpm
- Outdoor fan rotation & rpm
- Cooling amp draw
- Cooling compressor pressures
- Outdoor fan relay test
- Gas heat test (includes manifold pressure, gas flow, and ignition control tests)
- Economizer wiring and module
- Outdoor air sensor
- Hardware test mode (verifies unit will enter service test mode)
- LTB jumper verification (verifies the jumpers on the low voltage terminal board)

Factory mounted accessories: To save the cost of field installation labor, and risk of damage, the following accessories shall be factory mounted

- ReliaTel Microprocessor controller
- Lontalk communication interfaces
- Hail guards
- Economizer outside air damper
- Barometric relief damper
- Motorized OA damper
- Phase monitor
- Compressor Discharge line thermostat
- Low ambient cooling to 0 deg F

SUBMITTAL DRAWINGS: High unit efficiency is a critical component to this project and Sevier County. All bidders are to provide two sets of printed submittal drawings with their bid. Drawings must demonstrate that full load (EER) and part load (IEER) efficiencies meet or exceed those listed in the table above.

WARRANTIES:
5 year Parts AND Labor on the whole unit
10 year compressor warranty (parts only after the 5th year)
10 Year gas heat exchanger warranty (parts only after the 5th year)

LABOR Warranty note: Manufacturer must be capable of providing 5 year LABOR warranty. This warranty is to be supported by factory employed, and trained technicians located within 50 miles of the Sevier County Jail.
Labor warranty is not allowed to be outsourced to non-manufacturer personnel.

Detailed Unit Specifications

Mechanical Specifications - 4-15 Ton R410A Gas/Electric Rooftop Units

Single-Zone VAV (7.5 tons and above) Shall vary the indoor fan speed as the zone cooling or heating load changes, while cooling capacity is cycled to maintain the supply air temperature at setpoint. The indoor fan shall operate at maximum speed whenever the heater operating.

Basic unit characteristics
The operating range shall be between 115°F and 0°F in cooling as standard from the factory for units with microprocessor controls. Cooling performance shall be rated in accordance with ARI testing procedures. All units shall be factory assembled, internally wired, fully charged with R-410A, and 100 percent run tested to check cooling operation, fan and blower rotation, and control sequence before leaving the factory.

General
The units shall be convertible airflow. The operating range shall be between 115°F and 0°F in cooling as standard from the factory for units with microprocessor controls. Operating range for units with electromechanical controls shall be between 115°F and 40°F.

Cooling performance shall be rated in accordance with ARI testing procedures. All units shall be factory assembled, internally wired, fully charged with R-410A, and 100 percent run tested to check cooling operation, fan and blower rotation, and control sequence before leaving the factory. Wiring internal to the unit shall be colored and numbered for simplified identification. Units shall be UL listed and labeled, classified in accordance for Central Cooling Air Conditioners.

Supply Fans:
7.5 and 10 ton units: The Supply fan is a direct drive plenum fan, with backward curved wheel, and variable speed motor. Plenum fan design shall include a backward-curved fan wheel along with an external rotor direct drive variable speed indoor motor. All plenum fan designs will have a variable speed adjustment potentiometer located in the control box.

4, 5 and 15 ton units: Belt driven, FC centrifugal fans with adjustable motor sheaves.

Supply Fan Motors
All motors are thermally protected. All indoor fan motors meet the U.S. Energy Policy Act of 1992 (EPACT).

Unit Casing
Unit casing shall be constructed of zinc-coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized, and finished with a weather-resistant baked enamel finish. Unit's surface shall be tested 672 hours in a salt spray test in compliance with ASTM B117. Cabinet construction shall allow for all maintenance on one side of the unit. Service panels shall have lifting handles and be removed and reinstalled by removing two fasteners while providing a water and air tight seal. All exposed vertical panels and top covers in the indoor air section shall be insulated with a cleanable foil-faced, fire-retardant permanent, odorless glass fiber material. The base of the unit shall be insulated with 1/8 inch, foil-faced, closed-cell insulation. All insulation edges shall be either captured or sealed. The unit's base pan shall have no penetrations within the perimeter of the curb other than the raised 1 1/8 inch high downflow supply/return openings to provide an added water integrity precaution, if the condensate drain backs up. The base of the unit shall have provisions for forklift and crane lifting, with forklift capabilities on three sides of the unit.

Phase monitoring- Phase monitor shall provide 100% protection for motors and compressors against problems caused by:
- Phase loss protection
- Phase monitoring protection
- Phase unbalance protection

Phase monitor is equipped with an LED that provides an ON or FAULT indicator. There are no field adjustments. The module will automatically reset from a fault condition.

Discharge line thermostat: For enhanced compressor protection, a discharge line thermostat is standard on the compressor discharge line. It provides extra protection to the compressors against high discharge temps in case of loss of charge, extremely high ambient and other conditions.

Low airflow capability- If necessary, units can now operate at lower than the typical 400 cfm/ ton airflows- 200-300 cfm/ ton is now allowed.

Compressors
All units have direct-drive, hermetic, scroll type compressors with centrifugal type oil pumps. Motor shall be suction gas-cooled and shall have a voltage utilization range of plus or minus 10 percent of unit nameplate voltage. Internal overloads shall be provided.

Dual compressors are provided for 7.5 through 15 tons. **These High Eff units utilize unequally sized compressors for three stage cooling** for outstanding humidity control, light load cooling conditions and system back-up applications.
Crankcase heaters and High Pressure Cutouts are provided.

LonTalk Communication Interface
This option shall be provided to allow the unit to communicate as a Tracer LCI-R device or directly with generic LonTalk Network Building Automation System Controls.

Refrigerant Circuits
Each refrigerant circuit offer thermal expansion valve as standard. Service pressure ports, and refrigerant line filter driers are factory-installed as standard. An area shall be provided for replacement suction line driers.

Air Filters
2 inch Throwaway filters are provided for all units.

Evaporator Coils- copper tube/ Aluminum fins
Internally finned, 5/16" copper tubes mechanically bonded to a configured aluminum plate fin shall be standard. Coils shall be leak tested at the factory to ensure the pressure integrity. The evaporator coil and condenser coil shall be leak tested to 600 psig. The

assembled unit shall be leak tested to 465 psig. The condenser coil shall have a patent pending 1+1+1 hybrid coil designed with slight gaps for ease of cleaning. A removable, reversible, double-sloped condensate drain pan with through the base condensate drain is standard.

Condenser Coils- Advanced Microchannel type coils
The microchannel type condenser coil is standard for all high efficiency models except the one 10 ton unit. Due to flat streamlined tubes with small ports, and metallurgical tube-to-fin bond, microchannel coil has better heat transfer performance. Microchannel condenser coil can reduce system refrigerant charge by up to 50% because of smaller internal volume, which leads to better compressor reliability.

Outdoor Condenser Fans
The outdoor fan(s) shall be direct-drive, statically and dynamically balanced, draw-through in the vertical discharge position. The fan motor shall be permanently lubricated and shall have built-in thermal overload protection.

Microprocessor Controls
Units shall utilize microprocessor controller rather than the old style electro-mechanical type. This provides, anti-short cycle timer for compressor protection, and Low ambient cooling capability to 0 deg F. Unit shall be completely factory-wired with necessary controls and contactor pressure lugs or terminal block for power wiring. Microprocessor controls provide for volt control functions. The resident control algorithms shall make all heating, cooling, and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point, and provides better building comfort. A centralized Microprocessor shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.

Economizer and Barometric Relief Damper
This accessory shall be provided with barometric relief damper to relieve building over pressurization during economizer mode. The assembly includes fully modulating 0-100 percent motor and dampers, minimum position setting, preset linkage, wiring harness with plug, spring return actuator and fixed dry bulb control. The barometric relief shall provide a pressure operated damper that shall be gravity closing and shall prohibit entrance of outside air during the equipment off cycle. The economizer arrives in the shipping position and shall be moved to the operating position by the installing contractor.

Motorized Outside Air Dampers
Outdoor air dampers shall open to a set position when indoor fan starts. The damper shall close to the full closed position when indoor fan shuts down. Manually set outdoor air dampers shall provide up to 50 percent outside air. The desired operating position is set during unit start-up by the installing contractor.

Gas Heating Section
The heating section shall have a progressive tubular heat exchanger design using stainless steel burners and corrosion resistant steel throughout. An induced draft combustion blower shall be used to pull the combustion products through the firing tubes. The heater shall use a direct spark ignition (DSI) system. On initial call for heat, the combustion blower shall purge the heat exchanger for 20 seconds before ignition. After three unsuccessful ignition attempts, the entire heating system shall be locked out until manually reset at the thermostat/zone sensor. Units shall be suitable for use with natural gas or propane (field-installed kit) and also comply with the California requirement for low NOx emissions (Gas/Electric Only).